Kobayashi (JP 2004-071473 A)
Translation of Paragraphs 0028-0032 & 0086

[0028]
The wettability variability layer 3 consists of a material having its surface wettability changeable by applying an energy thereto. Specifically, the material is preferably a silicon compound such as organopolysiloxanes, which has a high binding energy such that the material may not be decomposed during the application of an energy to form patterned portions with high wettability. For example, the material includes (1) an organopolysiloxane obtained by subjecting chlorosilane, alkoxysilane or the like to hydrolysis and polycondensation through sol-gel reaction, etc. which shows a high strength, or (2) an organopolysiloxane obtained by crosslinking reactive silicones excellent in water repellency or oil repellency.

[0029]
In the above case (1), the organopolysiloxane is mainly composed of one or two or more hydrolysis condensates or co-hydrolysis compounds of a silicon compound expressed by the general formula Y_nSiX_{4-n} (n is an integer of 1-3). In the general formula Y_nSiX_{4-n}, Y is for example an alkyl group, a fluoroalkyl group, a vinyl group, an amino group or an epoxy group, and X is for example a halogen, a methoxyl group, an ethoxyl group or an acetyl group.

[0030]
The compounds of the general formula Y_nSiX_{4-n} include methyltrichlorosilane, methyltribromosilane, methyltrimetoxysilane, methyltriethoxysilane, methyltriisopropoxysilane, methyltri-t-butoxysilane, ethyltrichlorosilane, ethyltribromosilane, ethyltrimethoxysilane, ethyltriethoxysilane, ethyltriisopropoxysilane, ethyltri-t-butoxysilane, n-propyltrichlorosilane, n-propyltribromosilane, n-propyltrimethoxysilane, n-propyltriethoxysilane, n-propyltriisopropoxy silane, n-propyltri-t-butoxysilane,

n-hexyltrichlorosilane, n-hexyltribromosilane, n-hexyl trimethoxysilane, n-hexyltriethoxysilane, n-hexyltriisopropoxysilane, n-hexyltri-t-butoxysilane, n-decyltrichlorosilane, n-decyltribromosilane, n-decyltrimetoxysilane, n-decyltriethoxysilane, n-decyltriisopropoxysilane, n-decyltri-t-butoxysilane, n-octadecyltrichlorosilane, n-octadecyltribromosilane, n-octadecyltrimethoxysilane, n-octadecyltriethoxysilane, n-octadecyltriisopropoxysilane, n-octadecyltri-t-butoxysilane, phenyltrichlorosilane, phenyltribromosilane, phenyltrimethoxysilane, phenyltriethoxysilane, phenyltriisopropoxysilane, phenyltri-t-butoxysilane, tetrachlorosilane, tetrabromosilane, tetramethoxysilane, tetraethoxysilane, tetrabutoxysilane, dimethoxydiethoxysilane, dimethyl dichlorosilane, dimethyldibromosilane, dimethyldimethoxysilane, dimethyldiethoxysilane, diphenyldichlorosilane, diphenyldibromosilane, diphenyldimethoxysilane, diphenyldiethoxysilane, phenylmethyldichlorosilane, phenylmethyldibromosilane, phenylmethyldimethoxysilane, phenylmethyldiethoxysilane, trichlorohydrosilane, tribromohydrosilane, trimethoxyhydrosilane, triethoxyhydrosilane, triisopropoxyhydrosilane, tri-t-butoxyhydrosilane, vinyltrichlorosilane, vinyltribromosilane, vinyltrimetoxysilane, vinyltriethoxysilane, vinyltriisopropoxysilane, vinyltri-t-butoxysilane, trifluoropropyltrichlorosilane, trifluoropropyltribromosilane, trifluoropropyltrimethoxysilane, trifluoropropyltriethoxysilane, trifluoropropyltriisopropoxysilane, trifluoropropyltri-t-butoxysilane, γ-glycidoxypropylmethyldimethoxysilane, γ-glycidoxypropylmethyldiethoxysilane, γ-glycidoxypropyltrimethoxysilane, γ-glycidoxypropyltriethoxysilane,

γ-glycidoxypropyltriisopropoxysilane,
γ-glycidoxypropyltri-t-butoxysilane,
γ-methaacryloxypropylmethyldimethoxysilane,
γ-methaacryloxypropylmethyldiethoxysilane,
γ-methacryloxypropyltrimethoxysilane,
γ-methacryloxypropyltriethoxysilane,
γ-methacryloxypropyltriisopropoxysilane,
γ-methacryloxypropyltri-t-butoxysilane,
γ-aminopropylmethyldimethoxysilane,
γ-aminopropylmethyldiethoxysilane,
γ-aminopropyltrimethoxysilane,
γ-aminopropyltriethoxysilane,
γ-aminopropyltriisopropoxysilane,
γ-aminopropyltri-t-butoxysilane,
γ-mercaptopropylmethyldimethoxysilane,
γ-mercaptopropylmethyldiethoxysilane,
γ-mercaptopropyltrimethoxysilane,
γ-mercaptopropyltriethoxysilane,
γ-mercaptopropyltriisopropoxysilane,
γ-mercaptopropyltri-t-butoxysilane,
β-(3,4-epoxycyclohexyl)ethyltrimethoxysilane or
β-(3,4-epoxycyclohexyl)ethyltriethoxysilane, or a partial hydrolysate of each of the above members, or a mixture with any combination of the above members.

[0031]

The silicon compound which has fluorine is preferable since it is excellent in spreading property when preparing and applying a coating liquid and since although it is liquid-repellant by itself, it has a large change in wettability when a wettability variability layer is prepared and an energy is applied thereto. It is particularly preferred to use a polysiloxane which contains a fluoroalkyl group. Sepcific examples of the polysiloxane which contains a fluoroalkyl group include hydrolysis condensates and co-hydrolysis condensates of one or two or more fluoroalkylsilanes, shown in the following paragraph. It is also possible to use generally known fluorine-containing

silane coupling agents.

[0032]

$CF_3(CF_2)_3CH_2CH_2Si(OCH_3)_3$;
$CF_3(CF_2)_5CH_2CH_2Si(OCH_3)_3$;
$CF_3(CF_2)_7CH_2CH_2Si(OCH_3)_3$;
$CF_3(CF_2)_9CH_2CH_2Si(OCH_3)_3$;
$(CF_3)_2CF(CF_2)_4CH_2CH_2Si(OCH_3)_3$;
$(CF_3)_2CF(CF_2)_6CH_2CH_2Si(OCH_3)_3$;
$(CF_3)_2CF(CF_2)_8CH_2CH_2Si(OCH_3)_3$;
$CF_3(C_6H_4)C_2H_4Si(OCH_3)_3$;
$CF_3(CF_2)_3(C_6H_4)C_2H_4Si(OCH_3)_3$;
$CF_3(CF_2)_5(C_6H_4)C_2H_4Si(OCH_3)_3$;
$CF_3(CF_2)_7(C_6H_4)C_2H_4Si(OCH_3)_3$;
$CF_3(CF_2)_3CH_2CH_2SiCH_3(OCH_3)_2$;
$CF_3(CF_2)_5CH_2CH_2SiCH_3(OCH_3)_2$;
$CF_3(CF_2)_7CH_2CH_2SiCH_3(OCH_3)_2$;
$CF_3(CF_2)_9CH_2CH_2SiCH_3(OCH_3)_2$;
$(CF_3)_2CF(CF_2)_4CH_2CH_2SiCH_3(OCH_3)_2$;
$(CF_3)_2CF(CF_2)_6CH_2CH_2SiCH_3(OCH_3)_2$;
$(CF_3)_2CF(CF_2)_8CH_2CH_2SiCH_3(OCH_3)_2$;
$CF_3(C_6H_4)C_2H_4SiCH_3(OCH_3)_2$;
$CF_3(CF_2)_3(C_6H_4)C_2H_4SiCH_3(OCH_3)_2$;
$CF_3(CF_2)_5(C_6H_4)C_2H_4SiCH_3(OCH_3)_2$;
$CF_3(CF_2)_7(C_6H_4)C_2H_4SiCH_3(OCH_3)_2$;
$CF_3(CF_2)_3CH_2CH_2Si(OCH_2CH_3)_3$;
$CF_3(CF_2)_5CH_2CH_2Si(OCH_2CH_3)_3$;
$CF_3(CF_2)_7CH_2CH_2Si(OCH_2CH_3)_3$;
$CF_3(CF_2)_9CH_2CH_2Si(OCH_2CH_3)_3$;
$CF_3(CF_2)_7SO_2N(C_2H_5)C_2H_4CH_2Si(OCH_3)_3$.

[0086]

[Examples]

(Example 1)

A glass substrate on which a transparent electrode pattern of indium tin oxide was laminated was provided. Onto the side of the glass substrate on which the transparent electrode